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ABSTRACT

Encouraged by evidence linking quality early care/education programs and improved student outcomes, a variety of school readiness programs and initiatives have been created. This report reviews and synthesizes evaluation studies conducted on early childhood interventions, focusing on programs emphasizing a school readiness goal. The report provides an overview of the evidence regarding effects of model early care and education programs and describes the program characteristics associated with program effectiveness. An extensive, systematic search of the literature identified 32 impact evaluations of recent school readiness initiatives, with selection criteria used to identify 20 studies most relevant to the research questions. Results from 11 studies coded as pre-experimental or correlational were analyzed and reported separately from the 9 quasi-experimental or experimental studies. Based on the synthesis, it was concluded that wide-scale school readiness interventions can have moderate effects on child outcomes, with the strongest evidence for benefits to children's social-emotional development. Positive results were also reported for language/literacy, mathematical thinking, and physical/health development, and for outcomes such as better attendance or fewer referrals for special services once the child entered school. The report notes that it was difficult to discern whether specific program features were associated with positive participant outcomes because experimental and quasi-experimental designs typically did not examine these relationships. Implications for program evaluation relate to research design and instrumentation as well as to program quality and the classroom dynamics. The report's two appendices include the data coding sheeting and tables delineating program characteristics and design characteristics of quasi-experimental and

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experimental evaluations, instruments used and outcomes assessed, and program and design characteristics of pre-experimental evaluations. (Contains 139 references.) (KB)

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Research Report

Expanded Learning Opportunities National Leadership Area

March 2003

Evaluations of School Readiness Initiatives: What Are We Learning?

by
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Evaluations of School Readiness Initiatives: What Are We Learning?

Introduction

The link between quality early care/education programs and improved student outcomes is fairly well established. Decades of research have clearly demonstrated that high-quality early care/education can promote positive developmental outcomes, both while children are in childcare and later as they enter school. Specifically, studies (e.g., Barnett, 1995; Guralnick, 1997; Karoly, Greenwood, Everingham, Houbé, Kilburn, Rydell, Sanders, & Chiesa, 1998) have found that children who received high-quality early care/education perform better on measures of cognitive and language development, and they are less likely to have been retained in later grades of school than children who did not receive high-quality care. Moreover, high-quality care shows positive associations with early social and emotional development (e.g., fewer behavior problems, greater cooperation with adults and peers, more sophisticated play). These findings seem to be particularly true for young children who are living in situations that place them at greater risk for school failure (e.g., poverty, low level of maternal education, single-parent household, and other factors that may limit their access to resources and experiences that enhance learning and development). Research indicates that these children are, in fact, the ones who benefit most from quality early childhood services.

Encouraged by this evidence, a wide variety of school readiness programs and initiatives have been created. At the heart of these efforts is a belief that the early years constitute an especially sensitive time in children's learning and development. Moreover, many experts believe that failure to provide children with the necessary resources and supports may create later problems that are far more difficult and costly to remedy. Head Start and Even Start represent examples of federal school readiness programs; however, a number of states and local districts have implemented school readiness programs as well. Examples include North Carolina's Smart Start program, Michigan's pre-kindergarten program, and Georgia's lottery-funded school readiness program.

The purpose of this paper is to conduct a review and synthesis of evaluation studies conducted on early childhood interventions, with a focus on programs that emphasize school readiness as a goal. This synthesis begins with an overview of the evidence regarding the effects of model early care and education programs and includes a discussion of the program characteristics associated with those findings. This literature provides an important context for understanding the actual subject of the synthesis, evaluations of school readiness initiatives. Following this section, the methodology and findings of the synthesis are presented. Implications of the findings are discussed in the final section.

Previous Research on Early Care and Education Programs

Model Early Care and Education Programs

The positive relationship between high-quality early childcare programs and children's development is one of the most consistent findings in developmental science (National Research Council, 2000). However, much of what is known and accepted about the effects of early childhood education programs comes from a small group of "model" programs. In this set of programs, researchers developed their own programs that allowed them to study the effects of exemplary practices. Typically, these programs received superior funding and were able to hire more highly qualified staff than typical early care and education programs. As a result, they were able to maintain a higher quality of care than large-scale, publicly funded programs (Barnett, 1995).

A recent article by Currie (2001) highlights four specific studies of model programs that stand out due to the rigor of the research. Each of these studies randomly assigned children to either treatment or control groups. In addition, none of these studies suffered from excessive attrition, and researchers were able to follow children at least into middle school. They include the Perry Preschool Project, the Carolina Abecedarian Project, the Early Training Project, and the Milwaukee Project. (The Infant Health and Development Project also used a randomized design and had low attrition, but children were only followed until age eight).

Follow-up studies of the Perry Preschool Project continue to gain attention because of the results and longevity of the study. The study originally involved 123 three- and four-year-olds. The children were randomly assigned to either a high-quality preschool program or a no-program control group. The children assigned to the preschool program attended a half-day program each day, and their families received a weekly home visit. Classroom ratios were very low (1:6), and all of the preschool teachers had master's degrees and training in child development. Data have been collected on children from both the treatment and control groups—annually from ages three through 11, ages 14–15, age 19, and age 27. Results indicated that participants in the preschool program had higher achievement test scores and graduation rates, as well as fewer incidents of criminal arrests and welfare use as reported by program participants (Schweinhart, Barnes, & Weikart, 1993).

In the more recent Abecedarian Project, researchers randomly assigned 111 infants into a treatment group that received high-quality childcare and a control group (Campbell & Ramey, 1994, 1995). The goal of the project was to prevent mental retardation and improve academic achievement when the children entered school. The children participated in their assigned groups for the first five years of their lives. Of the original 111 children, 92 were followed until age 15.

At the end of the preschool intervention, there was a statistically significant IQ (seven points) difference between the treatment and control group (Campbell & Ramey, 1994). This difference was seen again at age eight and age 12. At age 15, although the children who received treatment continued to outscore children in the control group, the difference was no longer statistically significant. Other findings indicate that program participants continued to score significantly higher on reading and mathematics tests (at ages 8, 12, and 15). They also were less likely to have been retained (significantly different at ages 8, 12, and 15) or to have received special education services (age 15 only) (Campbell & Ramey, 1995).

The Early Training Project began in 1962 with a group of low-income, African-American children (Gray, Ramsey, & Klaus, 1982). The purpose of the project was to assess the impact of a preschool intervention on attitudes relating to achievement and on academic performance. It also focused on engaging mothers in their children's learning. The intervention program consisted of a ten-week summer preschool program for the two to three summers prior to the first grade, plus weekly home visits during the remainder of the year. Results indicated some positive effects on individual IQs for the first few years; however, this effect diminished over time. Greater impact was noted on school performance variables. For example, the number of children in special education was significantly smaller for the experimental group. There also was a small effect on the grade retention rate and an increase in high school graduation rates. In terms of teen pregnancy, although there was no difference between the treatment and control in the rate of pregnancy, girls in the treatment group were significantly more likely to return and complete high school than girls in the control group.

The Milwaukee Project also was an attempt to improve cognitive development in high-risk families (Garber & Heber, 1977). This intensive intervention was designed for low-income, inner-city families with a maternal IQ below 75 and children between the ages of three months and six months. The six-year program offered extensive, daily, year-round educational

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programming for the child and vocational/education services to families, including job training, remedial education, parent counseling, and family crisis intervention.

Results of this program suggested that children who participated in the intervention obtained higher IQ scores, demonstrated better problem-solving skills, and had better attitudes toward learning. In addition, program participants scored significantly higher on language development than children who did not participate in the program.

Although "model" programs have provided the strongest evidence that early childhood education programs can have substantial effects on children's lives, additional evidence is available from large-scale research studies.

Evidence from Large-Scale Studies

The Cost Quality and Outcomes in Childcare Centers Study (Cost, Quality, and Outcomes Study Team, 1995) demonstrated that positive effects are not limited to special early intervention programs like the Abecedarian Project—even children in high-quality childcare programs benefit. The study, which began in 1993, was designed to examine the influence of care on children's development during preschool and as they moved into elementary school. Initially, researchers recruited a stratified random sample of 401 childcare centers within four states: California, Colorado, Connecticut, and North Carolina. Within each center, two classrooms were randomly selected for observation. These observations documented the quality of services provided by the center and the range of costs associated with those services.

After collecting data on the costs and quality of these programs, researchers identified classrooms that enrolled children who would be entering kindergarten in the fall of 1994. A total of 826 children were selected from 183 classrooms. Overall, the initial sample included 51% males and 49% females. Of these children, approximately 30% were children of color. The average level of maternal education was 14.2, and the average family income was $47, 753. Because of attrition, the number of children declined somewhat across each year so that by Year 5, there were 418 children from 160 of the 183 classes still participating.

Children were followed over a four-year period through the end of second grade. Controlling for demographic characteristics (i.e., maternal education and family income), researchers found that children in high-quality childcare programs performed better on measures of cognitive and social skills in childcare and at least through the end of second grade (the latest data point that has been reported). High-quality childcare seemed to have the greatest impact on children who are traditionally at risk of school failure (i.e., whose mothers had low education levels), and, conversely, when these children are enrolled in poor-quality childcare, they are at greater risk for doing poorly in school.

Similar results were found in a study conducted by the National Institute of Child Health and Human Development (NICHD, 2001). In this study, researchers examined the effects of children's experiences in childcare and their development over time. This study involved a total of 1364 children and their families recruited from ten sites located across the country. Beginning in 1991, children were enrolled at birth, and plans are to follow the children to the year 2005 through their sixth year of school.

Families included in the sample vary significantly with regard to economic and ethnic backgrounds. Approximately 76% of the families are white of non-Hispanic origin, nearly 13% of families are black, 6% are of Hispanic origin, 1% are Asian/Pacific Islanders/American Indians, and 4% are other minorities. About 10% of the mothers had less than a 12th-grade education, slightly over 20% of the mothers had a high school diploma, one-third had some

college, 20% had a college degree, and 15% had a graduate or professional degree. The average income for families participating in the study was $37,781. Researchers used this information to focus on the unique contribution that childcare experiences make to children's development—testing the effects of early care and education programs above and beyond the contributions made by the family and child characteristics.

Although the study is continuing, findings to date suggest that children in high-quality childcare arrangements score higher on tests of cognitive and language ability than children in lower-quality care. Children whose environments were stimulating and well organized scored higher on tests of vocabulary, short-term memory, and attention. Moreover, children from these environments got along better with peers.

Together, these findings demonstrate the importance of high-quality care as it relates to children's intellectual development and preschool skills.

Characteristics of High-Quality Early Childhood Programs

Over time, early childhood research has shifted from "Can early childhood programs positively affect the development of children?" to the more refined question of "What are the specific features/elements that seem to generate these effects, and do variations of these features moderate the effect on children's development?"

According to Bryant and Maxwell (1996), determining the characteristics of successful programs can be very difficult because of the complexity of including all of the potential characteristics in a single study. However, several reviews of this literature seem to agree that there are certain aspects of program quality that lead to greater benefits for children (Barnett, 1995; Clarke-Stewart, 1987; Halpern & Weiss, 1990; Phillips & Howes, 1987; Ramey & Ramey, 1992). Two common terms recur in the conceptualizations of program quality: (1) *structural factors* and (2) *process factors*. *Structural factors* usually refers to the way in which the program is organized or structured and includes variables such as:

Staff-to-child ratio
Group sizes
Specialized staff training in early childhood education

Other features of program quality, called *process factors*, focus more on the relationships between children and staff and the interactions that occur around learning. Some of these features include having:

Caring, responsive teachers who care for the same group of children over a long time period
A curriculum that provides an opportunity to participate in a variety of developmentally appropriate activities

Although it is the teacher and caregiver behaviors that form the core of children's classroom experiences, many have speculated that it is the structural factors that provide the foundation that either hinders or enhances the quality of process in a program. That is, teachers are more likely to engage in appropriate caregiving practices if they are part of a program that maintains good structural factors, such as smaller group sizes and larger numbers of staff per children (Powell, 1995).

Need for School Readiness Services and Evidence of their Impact

Despite the considerable evidence connecting quality early care and education with children's success in school, many children continue to enter school unprepared. Data from the recent Early

Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K) indicate that many children do not have the prerequisite skills and abilities they need to be successful in school (West, Denton, & Germino-Hausken, 2000; Zill & West, 2000). This study—one the largest and most comprehensive of its kind—was designed to describe the readiness of children as they entered into kindergarten. Researchers began by following a nationally representative sample of approximately 22,000 children from 1,277 programs. Data were collected along a number of dimensions of child development, including cognitive development, social/emotional development, and physical/psychomotor development. The results indicated that most of the children in the study entered kindergarten with basic skills pertaining to reading, mathematics, and social relationships. However, a significant percentage lagged behind their peers. For example, 18% of the children did not demonstrate that they were familiar with the conventions of print (i.e., they did not know that English print is read from left to right or where a story begins and ends), 34% could not identify letters of the alphabet by name, 42% were unable to count 20 objects, and six percent could not count ten objects.

Addressing the Need

Given the apparent need to address children's readiness and the evidence linking preschool participation with readiness, the prevalence of early childhood early intervention programs has increased dramatically over the past several years. In particular, states have begun to recognize the importance of early education in preparing children for school. A number of states and local districts are starting to integrate their pre-kindergarten initiatives with other early childhood programs—such as Head Start and childcare—to more effectively use the funds and resources that are available (Schulman, Blank, & Ewen, 1999).

According to recent statistics (*Education Week*, January 2002), 39 states, plus the District of Columbia, have begun to offer their own classroom-based pre-kindergarten programs for at least some of their three- to-five-year-old children. This number is up from ten states in 1980. In addition, 21 states, plus the District of Columbia, provided substantial funds to supplement Head Start programs operating in their states.

Despite these efforts to reach young children, most of these programs serve only a fraction of the children who could benefit from these services. Currently, most states focus their efforts on the neediest children—that is, children from low-income families or children with other risk factors, such as limited English proficiency or a teenage parent. Only three states—Georgia, New York, and Oklahoma—plus the District of Columbia have made preschool services available for all four-year-olds regardless of income of other identifiable risk factors (*Education Week*, January 2002). And within these, only Georgia mandates the provision of pre-kindergarten services in all districts. New York and Oklahoma allow districts to choose whether or not they will use state funds to provide pre-kindergarten services.

Even in these states where pre-kindergarten services are open to all who are interested, only a portion of the children are served. Georgia's program serves the greatest number of four-year-olds with approximately 63,000 enrolled. When combined with Head Start enrollment, this figure translates into about 70% of four-year-olds in some form of publicly funded preschool. In contrast to Georgia, Oklahoma only serves about one-half of its four-year-olds, and New York serves approximately one-quarter (*Education Week*, January 2002).

Beyond these state efforts, a number of local communities and districts are making a commitment to early childhood education. According to a recent report released by the General Accounting Office (GAO, 2000), local school districts are beginning to apply some of their Title I funds toward preschool services. A survey of 16,000 school districts from across the nation revealed that approximately 17% of the districts receiving Title I funds used a portion of those

funds for preschool services during the 1999-2000 school year. Numbers indicated that approximately 313,000 preschool-age children were served with those funds—this represents about eight percent of the children who will ultimately enter public school kindergarten.

Evaluations of School Readiness Initiatives

At the same time that programs and agencies are increasing their investments in children's early education, there also is increasing pressure to provide evidence of the effectiveness of these programs. Although much has been written about the effectiveness of small-scale model programs—and this literature has contributed much to our understanding of the benefits of early childhood intervention—there is little evidence to document whether these large-scale, publicly funded programs actually help children perform better in school. A recent survey of state-funded preschool programs (Ripple, Gilliam, Chanana, & Zigler, 1999) found that less than half of these programs had conducted an evaluation of their program's effectiveness. This raises numerous questions about the effectiveness of these programs and their capability of producing significant benefits.

In an attempt to answer some of these questions, Gilliam and Zigler (2001) conducted a meta-analysis of the available evaluations of state-funded preschool programs from 1977 to 1998. The authors concluded that, despite some of the methodological limitations of the evaluations, state-funded preschool programs might indeed help children perform better when they enter school. However, since this study was conducted, other states have implemented preschool programs, and additional work is needed to determine their effects.

As a result, the purpose of this section of SERVE's Expanded Learning Opportunities (ELO) research synthesis is to examine the effectiveness of a particular type of early care and education: school readiness initiatives. Rather than looking globally at the relationship between quality early childhood programs (which can include a variety of programs such as childcare, preschool, etc.) and student outcomes, the synthesis will focus on programs and initiatives designed specifically to prepare children for success in school. The synthesis will examine data that have been collected on these programs to answer the following questions:

What types of school readiness initiatives have been evaluated, and what research methodologies have been used to collect the data?
What are the outcomes associated with participation in school readiness programs?
What practices seem to best prepare children to enter school ready to learn and succeed?

By focusing on these questions, it is hoped that this synthesis will provide a detailed, critical review of the methods and findings of school readiness evaluations conducted recently and that it will clarify recommendations for policy, practices, and program evaluation.

The next section provides a detailed description of how the literature review was carried out and the process for including or excluding studies in the synthesis.

Methodology

Identifying the Relevant Literature

The Literature Search. Following a process outlined by Cooper (1998), an extensive search of the literature was conducted to identify impact evaluations of recent school-readiness initiatives. To identify relevant articles and reports, a list of key words was compiled that might be used to describe school readiness initiatives. Search terms included: *early intervention, school readiness, Head Start, family literacy, Even Start, pre-kindergarten,* and *kindergarten readiness.*

These terms were combined with key words such as *outcomes, evaluation*, and *results* to search specifically for studies that relate to program evaluations and child outcomes.

The search process included both formal and informal channels of research information. Databases were searched, including ERIC, PsychINFO, Dissertation Abstracts International, and SSCI. In addition, an extensive search was conducted of the World Wide Web using the terms outlined above. This led investigators to a variety of websites including: Child Trends, National Center for Early Development & Learning, Mathematica, RAND, Southern Regional Education Board, U.S. Department of Health and Human Services, and Regional Educational Laboratory websites. Links from each of these sites were followed and searched thoroughly. Finally, relevant conference presentations were located by reviewing past conference programs and proceedings for the American Educational Research Association (AERA), Association for Childhood Education International (ACEI), Head Start Research Conference, Improving America's School Act (IASA) Conferences, National Association for Elementary School Principals (NAESP), National Head Start Research Conference, and Society for Research in Child Development (SRCD).

In addition to the literature review process, early childhood specialists in each state department of education were contacted regarding their state's pre-kindergarten program. Specialists were contacted via meetings, listservs, and emails and asked to provide any evaluation reports that might document the effectiveness of their program.

The search process was conducted between January and April 2002 and yielded a total of 53 articles, reports, conference presentations, and dissertations disseminated between January 1997 and April 2002. Once these reports were compiled, the research team reviewed each of the documents to determine its suitability for possible inclusion in the synthesis. Documents that failed to provide a description of a specific program or initiative or documents that did not report on child outcomes were immediately eliminated. A total of 32 documents were identified as possible candidates for inclusion in the synthesis.

Narrowing the Pool. Selection criteria for the synthesis defined the nature of the program being evaluated and some basic requirements for the evaluation report. Documents/reports meeting the following criteria were included in the synthesis:

Publication date – Given the recent significant increase in the number of children served through school readiness initiatives and the relatively recent increase in the number of evaluations of such programs, the goal of this synthesis was to examine data from recently reported evaluations. Therefore, reports or studies published between January 1997 and April 2002 were included in the synthesis.
Location of the program – Only evaluations of school readiness initiatives located in the United States were included.
Nature of the program – The program must be a publicly funded program or intervention, which directly targets children from birth to age five. A stated goal of the initiative is to enhance children's readiness for school. In addition, programs must maintain a component of classroom-based services. Programs that solely used either a home visitation or parent education approach were not included. Neither were drop-in or childcare programs included.
Evidence of effectiveness – The report must present some type of child outcome data (e.g., achievement tests, retention, behavior problems, special education placement) indicating the effectiveness of the program.

Using this set of criteria, two members of the research team carefully reviewed the remaining documents to determine which studies were most relevant to the research questions. Study abstract or executive summaries were primarily used to determine if a study met the criteria. In instances where the abstract did not provide sufficient information to make a determination, the

full report was reviewed. There was 100% agreement between the coders regarding which studies should be retained and which ones should be eliminated from the synthesis.

Analyzing the Literature

Describing the Evaluations. Each of the remaining documents was coded using a detailed coding system designed to capture information about the nature of the school readiness program and the methods used to evaluate its effectiveness (see Appendix A). This included information about the number of children served, planned program activities/services, staff qualifications, etc. In terms of the evaluation of the program, coding focused on the research design, sampling procedures, measures/instruments, and outcome data.

Assessing the Quality of the Research Design. In the early childhood literature, there is considerable variability in the quality of research that has been conducted. While experimental design with randomized trials represents the standard by which research is measured, early childhood research has often relied on less rigorous methods. This has been particularly true with respect to four key elements of design:

Identification of the comparison group
Initial/follow-up sample sizes
Attrition
Measure of program effects (Barnett, 1995)

A tightly designed study allows the researcher to more confidently conclude that the results are due to the actual treatment/intervention rather than some other effects.

A careful analysis was conducted to assess the quality of the research studies included in this synthesis. Twenty of 32 evaluations provided child outcome data of some type and were included in this synthesis review. Data range from student achievement scores and report cards to information on children's attitudes toward school and the need for special services.

The type of research design was the key element in classifying studies at this stage in the process. Data on the design of the program reports were recorded on all 20 evaluation studies reporting outcome data. Studies were coded into one of four categories: pre-experimental, correlational, quasi-experimental, and experimental (as described in Campbell & Stanley, 1963). The codings were verified by an independent rater for five of the 20 studies (25%). The raters attained 100% agreement on ratings of the design classification. Studies employing either a quasi-experimental or an experimental design were deemed to have sufficient internal validity to place confidence in their results and were, therefore, reported separately from the pre-experimental studies in the synthesis of outcome data. It is recognized that pre-experimental and correlational designs, although not as strong in supporting causal conclusions related to outcomes, can contribute to the understanding of school readiness programs. Results from studies classified as pre-experimental and correlational designs are discussed in the section following the presentation of experimental and quasi-experimental studies.

Synthesizing the Evaluation Results. In order to synthesize the findings from the school readiness evaluations, the studies were grouped according to study design: quasi-experimental and experimental versus correlational or pre-experimental. From there, the program characteristics and evaluation findings were reviewed and patterns identified. It should be noted that in conducting a synthesis on the effects of a program, a quantitative meta-analysis is the preferable methodology. For the current synthesis, a full-blown meta-analysis was not possible due to limitations of the data provided in the reports. Effect sizes were calculated and presented for studies whenever possible; however, this was not possible for all the studies. It should also be noted that the data available for the synthesis were limited to publicly available study reports. It

is recognized that several of the studies are ongoing, and additional data may have been collected but not publicly available at the time the synthesis was conducted. Descriptions of the study design and the results may, therefore, be less than ideal. The research team made every effort to locate and analyze the most complete data available for each report. Readers are cautioned that the unit of analysis for this synthesis is the documents referenced, and these may or may not provide a complete description of the program and/or the research or evaluation being conducted on the program.

Results

The synthesis process revealed a number of findings about the character of school readiness initiatives and the outcomes associated with those initiatives. The results presented in this section will first address the research questions outlined in the introduction. For the two questions related to program outcomes, the discussion will focus specifically on the nine studies coded as either experimental or quasi-experimental; this will be followed by a discussion of the studies categorized as pre-experimental or correlational.

Research Question 1*: What types of school readiness initiatives have been evaluated, and what research methodologies have been used to collect the data?*

Description of Programs Reviewed

Understanding the outcomes of school readiness programs requires understanding the programs in which the children were enrolled. Table 1 (Appendix B) offers a brief description of the programs that were included in the synthesis. All of the 20 programs reviewed are ongoing large-scale public early childhood education programs. Of the 20, 13 are state-funded readiness initiatives administered by the state department of education or another state agency such as the Office of School Readiness (Georgia) or the Office of Community Development (Washington). Four of the reports focus on federal readiness initiatives such as Head Start, Early Head Start, and Even Start, and three of the reports focus on local programs (e.g., those supported by federal Title I funding).

Among the programs, there was some variation according to services offered, duration/intensity of the program, and program setting. Most of the programs operated on a nine-month (corresponding to school year), half-day schedule. With the exception of Early Head Start and Even Start, none of the programs enrolled children before the age of three, and most served children for one year just prior to kindergarten.

In addition to classroom-based services, several of the programs offered a range of assistance, including health/dental care, home visitation, hearing/vision screenings, and parental support.

In almost all of the studies examined, children and their families were low income, and the children were considered at risk for school failure. Moreover, there was considerable ethnic and geographic diversity across the studies reviewed.

Assessment of Research Design

The evaluation of programs and interventions designed to improve outcomes for children is an important piece of early childhood research. From these evaluations, we hope to determine if a program is being properly implemented and whether or not an intervention is having the intended effect on those served. However, being able to make a causal connection between a program and its outcomes calls for a well-designed evaluation with randomization. Randomization ensures that there are no systematic observable or unobservable differences between children assigned to the various treatment conditions except for the effects of the program itself.

As illustrated in Table 2, the number of program studies using a pre-experimental design versus a quasi-experimental or experimental is fairly even. Among the studies utilizing a pre-experimental design, most were a one-group, pre-test/post-test design or a one-group, case study design. Although data from these studies may begin to suggest some type of impact on children's readiness, it is difficult to draw conclusions that these programs were responsible for the changes noted. As a result, studies using a pre-experimental design are presented separately in the synthesis of outcome data.

Table 2: Research Design Used to Collect Outcome Data

Evaluation Study	Pre-Experimental Design	Quasi-Experimental Design	Experimental Design
Does Head Start help Hispanic children? (Currie & Thomas, 1999)		X	
2000 – 2001 Head Start/ECAP Outcomes Report – State of Delaware (Gamel-McCormick, M., Cummings, M., Cornwell, J., & Kersteter, P.G., 2001)	X		
Building their futures: How Early Head Start programs are enhancing the lives of infants and toddlers in low-income families. (Love, J. Kisker, E., Ross, C., Schochet, P., Brooks-Gunn, J., Boller, K., Paulsell, D., Fuligni, A., & Berlin, L., 2001)			X
An investment in children and families: Year 7 longitudinal study report. (Northwest Regional Educational Laboratory, 1999)		X	
National Evaluation of The Even Start Family Literacy Program (Tao, F., Gamse, B., & Tarr, H., 1998)	X		
Pre-K Longitudinal Study: Findings from the 1999-2000 School Year (Henry, G., Gordon, C., Mashurn, A., & Ponder, B., 2001)	X		
Head Start FACES: Longitudinal findings on program performance, third progress report (Zill, N., Resnick, G., Mckey, R., Clark, C., Pai-Samant, S., Connell, D., Vaden-Kiernan, M., O'Brien, R., & D'Elio, M. January 2001)	X		
Illinois Pre-kindergarten Program for Children At-Risk of Academic Failure: FY 2000 Evaluation Report (Illinois State Board of Education, 2001)	X		
Four-Year-Old At-Risk Program: Final Evaluation (Martinez, S., 2002)	X		
Kentucky Preschool Project (Hemmeter, M. L., 2000)		X	
Educational transitions in early childhood, middle childhood, and early adolescence: Head Start vs. public school pre-kindergarten graduates (Marcon, 2000)		X	
Children entering school ready to learn: School readiness baseline information. School year 2001-2002 (Maryland State Department of Education, 2002)	X		
Points of light: Third year report of the Michigan School Readiness Evaluation (Xiang, Z., Schweinhart, L., Hohmann, C., Smith, S., Storer, E., & Oden, S., 2000)		X	
Pre-kindergarten program product evaluation report, 1999-2000, School District of Michigan, Saginaw (Kurecka, P. &	X		

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Evaluation Study	Pre-Experimental Design	Quasi-Experimental Design	Experimental Design
Claus, R., July 2000)			
School entry assessment project: Report of findings (Pfannenstiel, J., 2001)	X		
Head Start's impact on school readiness in Ohio: A case study of kindergarten students (Cogswell, S., Lochtefeld, S., Skaggs, A., & Walker, J., 1998)		X	
2000 kindergarten survey report: Readiness to learn (Oregon Department of Education, 1999)	X		
Chicago Child-Parent Center Program (Reynolds, A., Temple, J., Robertson, D., & Mann, E., 2001)		X	
A six-county study of the effects of Smart Start childcare on kindergarten entry skills (Maxwell, K., Bryant, D., Miller-Johnston, S., 1999)		X	
Kindergartner's skills in Smart Start counties in 1995: A baseline from which to measure change. (Maxwell, K., Bryant, D., Keyes, L., & Bernier, K., July 1997)	X		
Total by Design Type	11	8	1

Experimental design was used in only one of the studies—the Early Head Start study conducted by Mathematica (see Table 3, Appendix B). In this study, children and families were randomly assigned to either a treatment group or a control at the time the intake was conducted. Consequently, all families were eligible for Early Head Start. This type of comparison group (i.e., waitlist comparison) provides a good test of a program's effectiveness because children and their families are both eligible to receive services and motivated to apply for the program. Those assigned to the treatment group received the full range of Early Head Start services, including child development and education services, healthcare screenings/treatment, family support services, and family involvement activities. Those assigned to the control group were not allowed to receive Head Start services until their children reached the age of three, although they were eligible to receive other services within the community. The researchers also attempted to control for non-response bias in their design. Therefore, the experimental design used in this study yields the highest degree of confidence in the causal relationship between the early childhood program and the reported outcomes.

Eight of the studies used a quasi-experimental design to gauge the impact of programs on student outcomes. In most instances, a non-equivalent control group was used (see Table 3, Appendix B). Typically, studies compared program participants with a group of non-program participants and attempted to control some of the potential bias by matching the two groups on related variables (e.g., race, gender, economic differences). This type of comparison—comparing children who received a particular intervention with children who did not—is methodologically the best for answering the question of whether a particular intervention had an impact on participants. However, as noted in a recent symposium on wide-scale early childhood assessment systems (Scott-Little, Brown, and Dufford-Melendez, 2001), school readiness programs are finding it increasingly difficult to locate comparison groups with non-served children. As services for pre-kindergarten children have expanded, the population of totally unserved children has decreased. A large proportion of preschool-age children are being served in some type of program, be it a school readiness program or childcare. Therefore, many programs have begun to compare children in one program with children in another program. Although not ideal from a pure methodological standpoint, it was determined that these studies can contribute to our

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understanding of the child outcomes associated with participation in school readiness programs, and studies with this type of research design have, therefore, been included in this analysis. The Smart Start (Maxwell, Bryant, & Miller-Johnston, 1999), Washington, DC Public Schools (Marcon, 2000), Chicago Child-Parent Center Program (Reynolds, Temple, Robertson, & Mann, 2001), Ohio Head Start (Cogswell, Lochtefeld, Skaggs, & Walker, 1998), and Currie & Thomas (1999) included comparisons of children participating in multiple types of services, as well as children who did not participate in a school readiness intervention in some of the studies. Please see the annotated bibliography that accompanies this report for further details about the methodologies utilized in each of the studies.

Research Question 2: *What are the outcomes associated with participation in school readiness programs?*

To examine the outcomes and effects of the programs included in this synthesis, data regarding measures, outcomes variables, statistical analyses, and effects were coded and summarized. Studies using experimental or quasi-experimental designs will be reviewed first, followed by studies using other designs. Table 4 (Appendix B) presents an overview of the instruments used and the outcomes assessed.

School Readiness Outcomes Assessed and Instruments Used

Outcomes were categorized into three major areas: child development, school performance, and long-term outcomes. Each area was then subdivided into domains (see Table 4, Appendix B). For example, the area of child development includes five domains: children's overall development, language/literacy skills, logic/math skills, child health/physical development, and social/emotional development. The area of school performance focuses on academic achievement test results, retention, special services (e.g., special education referral, speech/language services), attendance, and school adjustment/attitude. Long-term outcomes included two domains: dropout rate and arrest record.

All but two of the programs, Marcon (2000) and Reynolds et al. (2001), conducted assessment in the area of child development. Six of the nine programs focused on school performance outcomes, and only one program (Reynolds et al., 2001) examined long-term outcomes. Six of the programs reviewed assessed child outcomes in two areas—usually child development and school performance. A closer examination of the specific domains indicates that measures of language/literacy skills were the most commonly used. After language/literacy, children's social development, child health/physical development, and logic/math skills were the domains most commonly assessed.

In terms of instruments used, a wide variety of tests and procedures were employed among the 11 studies. Many of these are well-known, psychometrically valid instruments such as the Peabody Picture Vocabulary Test (PPVT), the Woodcock-Johnson, the Bayley Scales of Infant Development, and the Social Skills Rating Scale (SSRS). However, others were relatively unknown, locally developed instruments with little data regarding their validity or reliability, such as Student Behavioral Form (Washington State's ECEAP).

Outcomes of School Readiness Programs

Effects on Child Development

As noted above, the area of child development focused on outcomes related to children's overall development, language/literacy skills, math/logic, child health/physical development and social development. These areas are central to children's overall development and learning.

Before examining the data on child outcomes, it is necessary to consider the strengths and limitations of the research design and methodologies used within this group of studies. As noted above, some of the studies included less than ideal comparison groups because children in at least one of the comparison groups had not been randomly assigned and had experienced some type of preschool services. In addition, some of the studies (Marcon, 2000; Cogswell et al., 1998) did not take steps to assess whether families who selected one type of program or another (or who received no services) were comparable. Attrition was another issue in a few of the studies, particularly those that followed children over longer periods of time (Marcon, 2000; Xiang, Z., Schweinhart, L., Hohmann, C., Smith, C., Storer, E., & Oden, S., 2000). Typically, there was no reported analysis of how subjects who dropped from the program or study differed from those who did not. It is acknowledged that our analysis for this review is limited to publicly available reports and may, therefore, not present a complete picture of each of the research projects. In short, even though these studies have utilized the relatively rigorous designs for examining causal relationships between program interventions and child outcomes, we must be cautious in interpretations of the results. Given these considerations, we now turn to a description of the results reported in the quasi-experimental and experimental studies.

Language/Literacy Skills. Literacy and language development are key areas in children's ultimate success in school. Many experts believe children's early experiences with oral language development, their interest in books, and efforts to "write" or draw with scribbles begin to build a strong foundation for reading success.

Among the program studies reviewed for this synthesis, measures of children's language/literacy skills focused primarily on children's knowledge and understanding of print, their ability to recognize letters and identify sounds, and their ability to comprehend. Eight of the nine programs with experimental or quasi-experimental research designs measured the effects of the program on language and literacy skills. Three of those programs found significant effects for program participants. For example, small positive effects were noted in the Early Head Start (EHS). This study found that, at 24 months, children in EHS programs were using a larger number of words, and they were more likely to use grammatically complex phrases and sentences than were children in the control group (Love, Kisker, Ross, Schochet, Brooks-Gunn, Boller, Paulsell, Fuligni, & Berlin, 2001). Currie & Thomas (1999) also found benefits for Hispanic children attending Head Start. Participation in Head Start had a positive effect on children's performance on the Peabody Picture Vocabulary Test (PPVT). A third study evaluating the impact of a state pre-kindergarten program (Michigan School Readiness Program) found significant results in language/literacy for kindergarten children ($d = .33$).

Math/Logic. In addition to language/literacy, several of the programs included in this review examined children's knowledge and understanding of math. Typically, math/logic skills center around one's ability to understand numbers/shapes, solve mathematical operations, and identify solutions to problems. Of the nine programs reviewed, four included some measure of children's knowledge and skills with numbers. Only one of the programs (Currie & Thomas, 1999) collecting data on children's early math skills reported significant findings. According to Currie & Thomas (1999) Hispanic children who participated in Head Start scored higher on measures of math/logic than their siblings who attended other preschools or who did not attend preschool at all.

Social Relations. Although the focus of most readiness initiatives has been on children's cognitive development and school success, recent reviews (Peth-Pierce, 2000) affirm the importance of children's social/emotional development in determining school success. Generally, children's social skills are conceptualized along two dimensions—prosocial behavior and problem behavior (Meece, 1997, as cited in West, Denton, & Germino-Gausken, 2000). Prosocial behavior tends to refer to behaviors that facilitate interaction such as sharing, turn-taking, and cooperating with others. In contrast, problem behaviors (e.g., fighting, arguing) tend

to interfere with good social relationships. Of the nine programs reviewed, six included some measure of children's social competence, and five reported significant differences between groups of children. In one of the studies, effects were found for kindergarten children (Michigan School Readiness Program). For example, students who had participated in the Michigan School Readiness Program scored significantly higher on the social relations subscale than students who had not participated in the program (d = .30). Looking at slightly younger children, preliminary results of the Early Head Start study indicated that, at two years of age, children participating in Early Head Start programs display lower levels of aggression as reported by parents.

Two of the state pre-kindergarten programs found significant results in favor of the comparison groups (Ohio Head Start and Washington), while one program found no differences between groups on measures of social competence (Smart Start).

Child Health/Physical Development. Children's physical health and well being are important precursors for success in school. Children who are healthy, alert, and energetic are able to give their full attention to learning in school (National Education Goals Panel, 1997). Moreover, how well children are able to perform the typical motor skills/coordination for their age may influence how well they do in school. For example, children with poor fine motor skills will have difficulty holding a pencil, which will, in turn, affect their ability to print letters and words.

Of the nine program studies reviewed, five included some measure of children's physical health/development. Two of the studies (Smart Start and Michigan School Readiness Program) reported significant differences between groups of children with small to moderately sized positive effects noted for children who participated in the program (d = .29 and d = .29, respectively). Another two programs (Early Head Start and Washington's ECEAP) found no difference between children on measures of physical development/health.

School Performance

School outcomes were measured by attendance, rates of grade retention, school adjustment, special services referrals/placement, and performance on standardized achievement tests.

Attendance. Three of the program studies documented school attendance as a measure of school performance. Two of the three programs reported no significant difference between the program group and comparison group for kindergarten attendance (Ohio Head Start and Washington's ECEAP). The third program (Michigan School Readiness Program) study found higher first-grade attendance rates for program attendance, although the effect was very small (d = .07).

Retention. Retention is another key variable in determining children's success in school. Statistically significant effects on grade retention were found in three of the five studies that reported collecting relevant data (Currie & Thomas, 1999; Reynolds et al. 2001; Xiang et al., 2000). A fourth study (Marcon, 2000) found no significant difference between the program participants and a comparison group. The fifth study reported collecting retention data; however, findings for this information were not described in the document (Washington's ECEAP).

School Adjustment. Looking next at adjustment and attitude toward school, one of the two program studies that collected data (Washington's ECEAP) found no significant difference between program participants and the comparison group. The second study (Michigan School Readiness Program) found that grade 2 teachers rated MSRP students significantly higher in interest in schoolwork than children who had not participated in the program (d = .14).

Special services referral/placement. Children's placement and referral to special education services was another variable for determining the benefits of early intervention. Special education services may be measured in several ways. For example, programs may simply document whether a child has been referred for special services. Alternatively, programs may focus on the number of years children receive special services or the number of special services that children participate in. Of the nine programs reviewed, three (Washington's ECEAP; Marcon, 2000; Reynolds et al., 2001) included a measure indexing the receipt of special services. For example, Marcon (2000) found that special education placement of Head Start vs. pre-K graduates did not differ in either third or fourth grades. In terms of long-term effects, Reynolds et al. found that children with extended program participation experienced lower rates of special education placement (13.5% vs. 20.7%) at age 18.

Achievement tests. Finally, only one program used achievement tests to evaluate its effectiveness. Such tests tend to focus on academic accomplishments and are a measure of what has been taught in school. In a study conducted by Marcon (2000), children enrolled in the public pre-K program scored higher on the language portion of the Comprehensive Test of Basic Skills (CTBS) than did children enrolled in the local Head Start program.

Long-Term Outcomes

Of the studies included in this review, only one, Reynolds et al. (2001), has continued to follow children beyond the formal school years. The most recent evaluation of the Chicago Child-Parent Center focused on the long-term effects of this program—school dropout, high school completion, criminal arrests, grade retention, and special services. The results of this study indicated that at age 20, children who had participated in the preschool intervention had higher rates of high school completion and lower rates of school dropout. Participation in both preschool and school-age intervention were significantly associated with lower rates of retention and special education services at age 18.

Research Question 3: *What practices seem to best prepare children to enter school ready to learn and succeed?*

The third question driving this synthesis focuses on program effects associated with particular program features. That is, are there particular programs or constellations of services that are more effective than others? To answer this question, we began by examining results both within and across programs. Ideally, one would try to associate particular child effects with specific program features. However, none of the experimental and quasi-experimental studies provided this type of analysis. Rather, details about the program are provided but are not considered as variables for comparisons of child effects. Another factor that limits our ability to draw conclusions is the fact that the programs examined did not differ substantially from one another on several key program variables, such as the intensity of services. Finally, process features of program quality (such as teacher-child interactions) typically were not reported. We know from the general early childhood education literature that process features can have a tremendous impact on child outcomes associated with early childhood programs. Therefore, it was difficult to answer the third research question—"Which practices best prepare children for success in school?"—from the studies that have been conducted. However, some preliminary implications from the data or findings are presented in the discussion below in order to shed some light on the current state of research within wide-scale publicly funded preschool programs and illuminate areas in need of further research.

The Quantity of the Program

It has long been held that the more program children experience, the greater the benefit. When we look at program dosage, there are three general elements of dosage that must be

considered—age at entry, intensity, and follow-through. See Table 1 (Appendix B) for a summary of these features from each of the programs included in the review.

Age at entry. It has been suggested that the earlier an intervention begins, the greater the benefit to children and families; however, evidence of this is often confounded by other timing variables such as duration and intensity (Bryant & Maxwell, 1996). To some extent, this may depend on the program's goal or expected outcome. That is, if the goal is to improve the parent-child relationship, then early entry into a program focusing on parental sensitivity/responsiveness may help create a stable and secure attachment relationship. In contrast, a program focusing on early literacy and reading skills may not initiate treatment until children are age four.

Studies included in the synthesis typically began serving children at about the same age. With the exception of the Early Head Start program, children entered the program at age three or four and exited at age five, just prior to kindergarten. This limited variation in the age of entry meant that it was difficult to discern any specific effects associated with serving children at an earlier age. Perhaps as Early Head Start follows children into later years, and other studies of programs that begin during infancy are conducted, data will emerge to allow an analysis of program effects by the age of child entry.

Intensity. Intensity typically reflects the amount of time that is actually spent in direct contact with the program. That is, how many hours per day, how many days per week, and how many weeks per year. Again, many believe that the greater the intensity, the more lasting the benefit. Moreover, there is some speculation that there is some minimal level of intensity that must be met before program benefits are apparent.

Looking across the programs included, most served children part day for at least four days per week. Only one program (Washington's ECEAP) allowed children to be served less than four days per week (minimum of three days/ten hours per week). At least three of the programs (Marcon, 2000; Reynolds et al., 2001; Love et al., 2001) allowed children to be served, at least part-day, five days per week. To gain a better understanding of the relationship between program intensity and child outcomes, it will be necessary to examine programs that serve children full-day and also full-year, as well as the part-day, part-year programs examined in studies included in this synthesis.

Duration or follow-through. In this case, *follow-through* refers to the length of time that a child has spent in a school readiness program, plus services provided once the child enters school. Among the studies reviewed in this synthesis, the Chicago Child-Parent Center (Reynolds et al., 2001) perhaps demonstrates the best example of this program feature. The Chicago Child-Parent Center (CPC) is a school-based early intervention program that provides comprehensive educational and family support services to disadvantaged families beginning in preschool (ages three or four) and extending into early elementary school (second or third grade). Evaluations of the CPC have consistently found that children who participate in this program score better on measures of school achievement and motivational development. Moreover, participation also is associated with higher levels of parent involvement (Reynolds et al., 2000). Other evaluations of the CPC (Fuerst & Fuerst, 1993) have found that children who participated in the program for at least four years have higher eighth-grade achievement scores and higher rates of high school graduation than do children with no participation.

Program Quality

Beyond intensity and duration, there are structural factors related to program quality that seem to produce better child outcomes. For example, programs that maintain smaller groups of children and lower staff-child ratios are associated with better social and cognitive outcomes. Moreover,

programs that employ staff with higher levels of training and education tend to be associated with more positive cognitive and social outcomes.

Looking first at child-teacher ratio and group size, research supports the view that small class size and low teacher-child ratio contribute to benefits for young children (Frede, 1995). Almost all of the studies reviewed for this synthesis maintained some standard for ensuring that children were served in small groups with adequate access to caregivers (see Table 1, Appendix B). In fact, most of the programs maintained group sizes and ratios that were consistent with those recommended by the National Association for the Education of Young Children (NAEYC).

In terms of teacher qualifications, again the literature supports the importance of highly qualified staff who understand the importance of child development and have the training needed to apply that knowledge as they work with young children. Of the programs reviewed, five (Ohio Head Start, Michigan School Readiness Program, Kentucky Preschool Program, Marcon (2000), and Washington State's ECEAP) required that teachers have earned a bachelor's degree and obtained a teaching certificate in early childhood education. Another four programs (local or federal Head Start programs) required that the lead teacher in each class have earned a Child Development Associate (CDA) credential or an associate's degree (AA).

Services Offered

Finally, there is some evidence that successful programs provide children with enhanced services such as home visits, family support, health care/screening, and supplemental activities for families. Several of the documents reviewed (Love et al., 2001; Cogswell, 1998; Currie & Thomas, 1999; Marcon, 2000) were evaluations of Head Start programs (i.e., federally funded and state expansions of Head Start services). Unlike many other programs that provide services to children, Head Start has a broader mission that requires programs to provide a comprehensive set of services, including educational, health (i.e., medical, dental, and mental health), nutritional, and family support services. However, other programs offered supplemental services as well. For example, the Michigan School Readiness Program provided home visits by staff, parent education classes, and scheduled family events. Washington's ECEAP program provides families with case management services, access to support groups, and home visits by staff. Finally, the Chicago Child-Parent Center provided families with comprehensive health, education, and family services (Reynolds et al., 2001). It seems possible that these more comprehensive programs might yield greater benefits in terms of child outcomes. However, data from the studies included in this review did not address this issue directly.

Methods and Findings from Programs Using Non-Experimental Design

As previously mentioned, there were 11 program reports/articles that did not use a comparison group (see Tables 5 and 6, Appendix B). Although our ability to draw causal conclusions is limited, these pre-experimental studies can contribute to our understanding of school readiness interventions. Many of these studies collected more data on the implementation of the programs and some of the quality variables that were noted as lacking in the experimental and quasi-experimental studies described above. Researchers and evaluators conducting these studies have most likely selected the particular design for a specific reason or reasons. For example, the pre-experimental designs usually are more practical for programs. In addition, the purpose of the research may lend itself to a pre-experimental design that focuses more on program implementation than comparison of child effects. Finally, the pre-experimental studies may be exploratory in nature, providing critical information to inform future research questions for experimental or quasi-experimental research. In short, these studies can make a valuable contribution to the literature. What follows is a review of the 11 studies that utilized pre-experimental or correlational research designs. The methods and findings from these studies are

summarized. Readers can find additional details about these studies in the Annotated Bibliography that accompanies this report.

In most instances, the data collection methods in these studies were primarily a one-group, pre-test/post-test design. Most commonly, a pretest was administered to a group of children who had participated in the pre-kindergarten program, and a post-test was administered to see what changes had taken place during the time they were in enrolled in the program. A large number of these reports relied on checklists, teacher ratings, or teacher survey results to estimate program impacts. These ratings usually focused on three domains of development: cognitive, social/emotional, and physical development. For example, an evaluation study of North Carolina's Smart Start initiative (Maxwell, Bryant, Keyes, & Bernier, 1997) asked 858 kindergarten teachers to rate incoming kindergarten students on their pre-academic and social skills. According to the teachers surveyed, approximately 18% of kindergartners were not ready at the beginning of the year to participate successfully in school. A survey also was conducted among kindergarten teachers in Oregon (Oregon Department of Education, 1999). Using the Kindergarten Readiness Survey, teachers were asked to rate children's skills as they entered school. More than 900 kindergarten teachers rated children's development along various dimensions of readiness including language usage, approach to learning, cognition/general knowledge, social/emotional development, and motor development. Results from this survey indicated that approximately 65% of children met all of the readiness dimensions. When researchers examined children's readiness in the context of prior care experiences, they found that 88.6% of children who attended preschool were deemed "ready" on at least five of the readiness dimensions. This is in contrast to 69.7% of children who attended Head Start and 52.6% of children who attended the Early Childhood Special Education program.

Similar percentages of children's readiness were found in a report of the Missouri School Entry Assessment Project (Pfannenstiel, 2001). A random sample of Missouri schools (10%) was selected for participation in an evaluation of children's readiness. From these schools, all kindergarten teachers were designated as participants, as were the children in their classrooms. Using the School Entry Profile, teachers were asked to rate children's preparedness for kindergarten. Overall, approximately 29% children were rated as "above average" in their preparedness for school, 21% were rated "below average," and 50% were rated as "average." Differences also were noted according to prior preschool experiences. Children who were in home-based care during the pre-kindergarten years performed lowest among kindergartners assessed, scoring lower on all domains. Children who attended preschool (e.g., Early Head Start, Head Start, and public preschools) and children who attended childcare programs scored average or slightly above average on all scales. The highest-performing children were those who participated in Parents as Teachers, plus some form of preschool. These children scored significantly higher on all domains of the School Entry Profile.

Two of the programs reviewed relied on elements of the Work Sampling System (Meisels, Jablon, Marsden, Dichtelmiller, & Dorfman, 1994) to measure children's readiness for school. The Work Sampling System is an assessment tool that was originally designed to improve teaching and instructional strategies; however, some states have adapted the instrument for use in determining what skills and abilities children bring with them at kindergarten entry. In 2002, the Maryland State Department of Education collected baseline information on incoming kindergarten students (Maryland State Department of Education, 2002). Results indicated that almost half (49%) of the students were rated "full readiness" by their teachers. Forty-four percent were rated as "approaching readiness," and seven percent were rated at the "developing readiness" level. In terms of children's previous care experiences, children who had participated in the "non-public nursery" program (i.e., preschool programs with an education focus) were rated "more ready" than children who participated in other forms of care. In contrast, children who were in family childcare or informal care with a relative were rated "less ready" than children in other forms of care.

Evidence from another school readiness initiative also seems to suggest that early childhood programs can have a positive impact on students' entry into kindergarten; however, it also raises questions about the sustainability of those effects. Evaluation of Kansas' Four-Year-Old At-Risk Program found that preschool experience was related to children's proficiency at the beginning of the kindergarten year in all domains of the Work Sampling System Checklist (Martinez, 2002). Students with preschool experience were still at a slight advantage in the spring of the kindergarten year; however, by the first grade, there were no statistically significant differences in proficiency ratings between children with and without preschool experience.

Four of the studies coded as pre-experimental (Head Start/FACES study, Even Start Study, Illinois, Delaware, and Saginaw, Michigan) included direct measures of student performance. Looking first at the Head Start Family and Child Experiences Survey (Zill, Resnick, McKey, Clark, Pai-Samant, Connell, Vaden-Kiernan, O'Brien, & D'Elio, 2001), this study involved a nationally stratified random sample of 3200 children and their families. The FACES child assessment consisted of a series of tasks designed to assess children's skills as they enter kindergarten. Direct assessments of children's cognitive development included measures such as the PPVT-III (receptive language skills), the Story and Print Concepts, the Phonemic Analysis Task from the Test of Language Development III (phonemic awareness), and subtests of the Woodcock-Johnson (letter-word identification, problem-solving, and dictation). In addition, information was gathered from parents and teachers to assess children's social/emotional development. Results found that children in Head Start showed significant gains in vocabulary, writing skills, and social skills. However, little or no change was noted in other areas of development, such as letter recognition and problem behaviors.

The evaluation of another federal program also found positive gains among the children served. Results from the national evaluation of the Even Start Family Literacy program (Tao, F., Gamse, B., & Tarr, H., 1998) indicate that participation in an early literacy project may promote educational gains for young children. Focusing on a sub sample (10%) of children who participated in the universe study, researchers used a statistical model to predict children's growth on the *Preschool Language Scale* (PLS-3) and the *Pre-school Inventory* (PSI). They concluded that children who remain in Even Start for longer periods of time will grow at a faster rate than those who do not remain in Even Start.

To evaluate early childhood programs in Delaware, researchers randomly selected children and families from local Head Start programs, as well as the state-funded Early Childhood Assistance Program (Gamel-McCormick, Cummings, Cornwell, & Kersteter, 2001). A total of 495 children were assessed in September and again in May with an approved instrument selected by the program. Standard scores were established to compare children's achievement in each of the following domains: cognitive, communication, physical, and social/emotional. Results indicate that children showed significant skill development in all four areas of development. On average, children demonstrated a 27.7% increase in cognitive skills, a 33.9% increase in communication skills, a 20.8% increase in physical skills, and a 26.1% increase in social/emotional skills.

In the only evaluation of a local program, researchers in Saginaw, Michigan, assessed more than 300 children who participated in the Saginaw Pre-kindergarten Program (Kurecka & Claus, 2000). Using the Pre-Kindergarten Saginaw Objective Reference Test (PK-SORT), researchers examined student achievement on a posttest-only basis. The PK-SORT includes 31 items dealing with both psychomotor and cognitive program objectives. It is administered to students on a one-to-one basis. Findings indicated that the majority of students attained all of the cognitive objectives and three of the four psychomotor objectives. The area of lowest attainment was expressive language/semantics (83.8%), while the area of expressive language/labeling demonstrated the highest level of attainment (98.7%).

Two of the programs reviewed have continued to follow students over time and included more long-term measures of student success: student retention (Georgia) and student achievement (Illinois). The Georgia study represents an evaluation of the Georgia Pre-kindergarten Program that was established in 1993 (Henry, Gordon, Mashurn, & Ponder, 2001). The evaluation, which was initiated in 1996, was designed to follow a probability sample of pre-kindergarten children into their elementary school years. Results indicate that, at the end of their second-grade year, 82% were deemed ready for the third grade, according to their second-grade teachers. More than half (56.1%) of the students were judged to be "extraordinarily good" to "good" in their preparation for the third grade. Students gained the most in math, science, and language arts. Although little change was noted in social behaviors, students' attitude toward learning and independence increased significantly during the year. The study also included a look at the relationship between teacher characteristics and child outcomes. Overall, students of teachers who believed in and practiced child-centered methods of instruction out-performed others during pre-K and kindergarten. Also, student outcomes varied according to the credentials and experience level of the teachers.

With regard to the Illinois Pre-kindergarten Program, results seem to suggest that early childhood programs may also have a positive effect on student grades—particularly for those students who may have been considered at risk for school failure (Illinois State Board of Education, 2001). Focusing on a sample of children who had previously participated in the program, researchers found that approximately 55% of third-grade students who participated in the program "met" or "exceeded" the standards in writing, while 75% "met" or "exceeded" the standards in mathematics (results based on the Illinois Standards Achievement Test). In eighth grade, 41% of the students "met" or "exceeded" the standards in mathematics, while percentages in writing and science were 64% and 72%, respectively.

This review of the pre-experimental studies clearly illustrates that researchers use a variety of methods to assess the effects of a program on children's well-being and development. Some studies selected teachers from a representative sample of schools and asked them to rate children's readiness on various domains. Others focused on a sample of children attending a set of classrooms or programs and selected them for observation or assessment. While there are obvious shortcomings to the pre-experimental design, such studies tend to be more practical as compared to the experimental design, which is often more difficult and expensive to implement. However, if a researcher chooses to employ a pre-experimental design, he/she must take additional care to test for and use control variables to minimize the differences between children in various groups.

Discussion and Recommendations

The recent increase in the amount of funding available for pre-kindergarten services indicates that many states, agencies, and local communities are making a commitment to early childhood care and education and to evaluation of the programs. A previous study published by Gilliam & Zigler (2001) found 13 state evaluations of child outcomes. Just five years later, this review yielded an additional eight evaluations of school readiness initiatives, as well as updated reports from seven studies included in Gilliam & Zigler (2001). In addition, there were numerous other local and federal evaluations. At the same time that programs and agencies are expanding their commitment to early childhood services, there is a strong push to demonstrate the value and effectiveness of these services.

Research Findings

Results from this synthesis indicate that wide-scale school readiness interventions can have moderate effects on child outcomes. Perhaps the strongest evidence comes from results associated with data collected on children's social-emotional development, with the largest

number of studies reporting children in school readiness programs having more positive social development than children in comparison groups. Positive results were also reported for children's language/literacy, mathematical thinking, and physical/health development and for student outcomes such as better attendance or fewer referrals for special services once the children entered school. Limitations in the research designs and the data reported in the documents examined in this synthesis, however, warrant caution when interpreting results. In general, most of the results can be characterized as small to moderate, and in each of the child outcomes examined, some studies reported positive results while others reported no significant differences.

Relative to particular features of program quality, it was difficult to discern whether specific program features are associated with positive participant outcomes. Studies that used experimental and quasi-experimental designs typically did not examine relationships between specific program features and child outcomes. Some of the most informative data relative to features of program quality come, perhaps, from the pre-experimental studies. For example, the evaluation study of Georgia's Pre-kindergarten Program noted significant differences in teacher effectiveness that related, not only to teacher training, but also to the number of years of experience (Henry et al., 2001). Specifically, the effectiveness of pre-kindergarten teachers who held a CDA declined as their years of experience increased. A similar decline was noted among teachers who had obtained a college degree, but who had not obtained certification. Interestingly, certified teachers were rated as less effective early in their careers; however, their effectiveness increased or remained constant as they gained experience. The authors speculate that perhaps certified teachers receive more effective training that allows them to put their knowledge to better use as they acquire more experience. Clearly, there is still much to learn about the relationship between features of program quality and outcomes for children.

Implications for Program Evaluation

Accountability for public spending is a factor driving many of the program evaluations that have been put into place. However, properly evaluating the effectiveness of a program or initiative can be challenging, and there is not yet a standard approach to conducting the evaluation.

Among the reports reviewed, there was considerable variation in the design of the programs, the overall objectives defined, and the services offered. Evaluation of these divergent programs is further complicated by the variation in the need for data and purposes for evaluations. Different stakeholders—community representatives, practitioners, policymakers, researchers, and families—may have different levels of need with regard to evaluation results. What satisfies one stakeholder may be inadequate for another (National Governor's Association, 2000).

In general, most of the programs reviewed demonstrated that they are beneficial to children, particularly low-income children; however, it is clear that many of these efforts must be accompanied by more carefully designed studies to ensure that we have a complete understanding of how these programs work and what their benefits are. For example, only one of the studies reviewed (Love et al., 2001)—a study of the Early Head Start program—used a randomly assigned control group. The remainder used less rigorous comparison groups such as matched program-eligible non-attendees or program eligible non-attendees who did not attend any other program. Moreover, some evaluations, such as Ohio Head Start (Cogswell et al., 1998) and Currie & Thomas (1999), used multiple comparison groups. The type of comparison group used can have a tremendous effect on the validity of the findings and how the findings are interpreted (Gilliam & Zigler, 2001). Gilliam, Ripple, Zigler, and Leiter (as cited by Gilliam & Zigler, 2001) suggest that it may be unfair to test the effectiveness of a program by comparing outcomes of children who have not participated in a similar program. This may bias the study toward positive results. In contrast, however, Schweinhart (1999) maintains that it is almost impossible to compare the effectiveness of Head Start, public pre-kindergarten programs, and

preschool childcare programs because they serve very different populations. Head Start serves primarily poverty-level families, and while income may be a consideration for public pre-kindergarten programs, it is usually one of several factors determining entry into the program. In terms of preschool childcare, enrollment into this type of program often hinges on the families' need for care so parents can work outside the home. Not only does this increase family income, but it also makes it extremely difficult to randomly assign children who need care to an unserved control group. Although it may not always be possible (or even desirable taking ethical concerns into consideration) to conduct randomized trials, these types of studies are the most effective for determining if the difference in outcomes is due to program intervention (Karoly et al., 1998).

Assuming one can establish an appropriate sample, it is then important to continue to follow those subjects across time in order to capture both long-term and short-term effects. As seen among studies of model programs (Campbell & Ramey, 1994; Schweinhart et al., 1993), there is evidence suggesting that early childhood programs may help buffer children against later problems such as delinquency or antisocial behaviors, as well as help promote later achievement (i.e., higher rate of graduation and lower dropout rate) (Yoshikawa, 1995; Reynolds et al., 2001). Unfortunately, following subjects over time often results in losses due to attrition. Attrition rates for studies included in this synthesis ranged from approximately 17% to more than 50%. Without an analysis of how the participants who dropped from the study compare with those who continued, our ability to draw conclusions from the research is limited.

In addition to designing more rigorous evaluations, researchers and program evaluators must also give attention to the methods and instruments used to monitor change in young children. The recent push toward accountability places further burden on both the assessment instrument and those responsible for collecting the data to accurately and fairly capture the effects of a program. As noted earlier, a potential problem with several of the studies was the use of tests with little known validity or reliability. However, this also calls into question the role of teachers and educators in the data collection process. In instances where teacher judgment of student learning is a key element of performance assessment, some researchers (Hoge & Coladario, 1989) have expressed concerns about the validity and reliability of teacher assessment, particularly in high-stakes situations. However, others (Meisels, Bickel, Nicholson, Xue, Atkins-Burnett, 2001; Schweinhart, in press) maintain that teachers can collect data that is both reliable and valid. These issues highlight the need to collect data in a consistent and standardized way that permits comparisons across classrooms or programs.

Another issue affecting the selection and use of assessment measures is the nature of children's development. As asserted by the National Education Goals Panel (1995) and reaffirmed in a recent report issued by the National Research Council and Institute of Medicine (2000), children's readiness is multidimensional. Moreover, young children's development is often sporadic and uneven. Consequently, researchers and evaluators must be careful to select instruments that capture children's full range of developments, as well as instruments that are reliable and valid. A recent article by Zaslow & Halle (in press) concludes that work is needed to strengthen assessments of certain dimensions of school readiness. The authors specifically mention the need to create better measures of children's social/emotional development. Current measures, particularly those measuring positive aspects of young children's social/emotional development, are limited by psychometric problems.

Beyond research design and instrumentation issues, researchers and program evaluators must also look at program quality and the dynamics that occur within the classroom. One cannot fully understand child effects without first considering the quality of the program. If a program fails to demonstrate positive results, absent a measure of quality, it is difficult to determine whether the results are due to a poorly designed program model or a poorly implemented program model (Gilliam & Zigler, 2001). With the exception of the Head Start/FACES study (Love et al., 2001) and the Michigan School Readiness Evaluation (Xiang et al., 2000), none of the programs used

quality as a means to better understanding their findings. Other program evaluations such as Georgia's (Henry et al., 2001) surveyed an element of quality, namely teacher beliefs/attitudes; however, there was not a separate measure of program quality. One benefit of examining program quality and child outcomes would be to determine if there are specific program aspects that should be the focus of more intense technical assistance or in-service training.

Although this synthesis just begins to touch on some of these issues, the programs reviewed help provide some insight. For example, the evaluation of the Chicago Child-Parent Center (Reynolds et al., 2001) suggests that the range of services and the extent to which these services are able to follow and support children as they enter school may be an important program factor. Moreover, these studies also seem to suggest that while it may be useful to intervene before the age of three, preschool and school-age interventions can also be effective.

There continue to be a number of unanswered questions about program design, and clearly, more research is needed. For example, at what point is it best to initiate services—infancy or preschool? Does the level of intensity make a difference, and if so, do the same levels benefit all children? What types of services or combination of services yield the best outcomes? These are just a few of the questions that the early childhood community struggles to answer, and evaluations are an important means for understanding how investments in early childhood initiatives will pay off.

Appendix A
ELO Research Synthesis 2002
Data Coding Sheet

REPORT IDENTIFICATION

1. Synthesis Strand: ____ Early Childhood ____ School-age

2. Report Code #: _____ 3. Publication Date: _____

4. Source of Report (Select one)
_____ a. Journal article (refereed)
_____ b. Journal article (non-refereed)
_____ c. Conference presentation
_____ d. Thesis or dissertation
_____ e. Organization or agency report (published)
_____ f. Organization or agency report (internal)
_____ g. Personal communication

5. Peer Review Process
_____ Peer reviewed _____ Not peer reviewed _____ Unknown

****

PROGRAM OR INTERVENTION INFORMATION

Type of Program (Select all that apply):

School Readiness:
_____ Head Start
_____ Pre-K or other school readiness program
_____ Even Start/Family literacy
_____ Other: _____

Transition:
_____ Transition to kindergarten
_____ Transition between grade levels
_____ Transition to/from after-school
_____ Transition beyond high school
_____ Other: _____

School-age:
_____ After-school
_____ 21st Century Community Learning Center
_____ Instructional Support Programs (Tutoring, Voyager, homework help, etc.)
_____ Extended School Time
___ Extended day ____ Extended Year ____ Summer School ____ Year-round
_____ Learning Centers (such as Sylvan)
_____ Technology assisted learning
_____ Other: _____

Characteristics of Program/Intervention Participants:

Student Characteristics:

Grade

_____ a. Preschool children
_____ b. Elementary
_____ c. Middle school
_____ d. High school
_____ e. Parents
_____ f. Other

Race (indicate the percentage)

_____ a. White
_____ b. African-American
_____ c. Hispanic
_____ d. Other (specify): _____
_____ e. Not specified

Gender (indicate the percentage)

_____ a. Female
_____ b. Male
_____ c. Not specified

Economic level (indicate the majority)

_____ a. Poverty
_____ b. Non-poverty
_____ c. Not specified
_____ d. Mixed

Special population (specify): _____

Setting (location of program)

_____ a. School
_____ b. Community-based
____ Faith-based
____ Non-faith-based
_____ c. Mixed
_____ d. Not specified

Setting

_____ a. Rural
_____ b. Urban
_____ c. Suburban

Name of City(ies): _____

Name of State: _____

Profile of Program/intervention:

_____ Number of children served/enrolled/involved (describe whether this is planned, observed, average, etc.) _____
_____ Number of hours of operation
_____ Duration of program (number of years in operation)

Source of funding

_____ a. Public
_____ b. Private
_____ c. Fee-based/for profit
_____ d. Mixed

****

EVALUATION STUDIES INFORMATION

Type of Evaluation:
_____ a. Formative
_____ b. Implementation
_____ c. Summative

_____ a. Internal
_____ b. External

Source of funding for evaluation: _____

Research Design

Design Type:
_____ Pre-experimental
_____ One group or case study
_____ One-group pretest-posttest design
_____ Survey
_____ Other:_____

_____ Correlational

_____ Quasi-experimental
_____ Nonequivalent control group, post-test only
____ Matching _____ No matching
Matched on:

_____ Nonequivalent control group, pre-test/post-test
_____ Matching _____ No matching
Matched on:

_____ Time series
_____ Cohort study
_____ Other: _____

_____ Experimental (with random assignment)
_____ Post-test only control group
_____ Pre-test post-test control group
_____ Other

Sampling:
_____ Random
_____ Judgment or convenience
_____ Sampling procedure unknown

If random assignment used, _____ students randomly assigned
_____ Classes randomly assigned
_____ Schools randomly assigned
_____ Other: _____

Sample

Total N: _____

Sample Size:

Treatment: _____

Control: _____

Attrition or Response Rate:
In treatment group: _____

In control group: _____

Excessive? _____ Yes _____ No

Gender: _____ % Female

Mean Age: _____ SD Age: _____

Multiple grades? _____ Yes _____ No

Race: _____ Percentage minority _____ Not specified

Treatment/Intervention

Independent variable: describe how the independent variable was administered:

Description of intervention:

Characteristics of intervention:
Adult:child ratio: _____
Education of adults (staff or volunteers):
_____ High school
_____ Some college
_____ College grads
_____ College plus

Specialized training for adults in program:
____ No
____ Yes
Please describe:

Length of intervention per week (hours):
Duration of program per year (months):
More than one year for average participants? ____ No _____ Yes
Number of years: _____
Program quality/model implementation validated? ___ Yes ____No
If yes, how?
Families involved in program? ____ Yes ____ No
If yes, describe how:

Any variation in treatments among study groups:

Control group:
_____ No treatment

_____ Placebo
_____ Treatment delayed

Potential problems with control group
____ Control group from different time period
____ Control group from a different grade
____ Multiple grades combined
____ Control group pre-existing or convenient
____ Other: _____

Theory

_____ Specified: _____

_____ Inferred: _____

_____ None

Measurement of Dependent Variables

Type of Dependent Variable Measure (Check All That Apply):
_____ Written measure completed by subject
_____ Verbal
_____ Behavioral
_____ Interpersonal judgment
_____ Program/School records

____ Informal
____ Standardized

Reliability established: _____ Yes _____ No
Type of reliability measures:

Same data collected for treatment and control group? _____ Yes _____ No

Results (Include effect sizes if available)

Outcome measure	Positive effect	No effect	Neg. effect	Comments (include whether results statistically significant)
a.				
b.				
c.				
d.				
e.				
f.				
g.				

Other results: specify
_____

Statistical analysis

Pre-test means: _____ Yes _____ No

Post-test means: _____ Yes _____ No

Pre-test standard deviations: ____ Yes ____ No

Post-test standard deviations: _____ Yes _____ No

Significance tests: _____ Yes _____ No

Type of inference test: ____ *F* ____ t _____ Other: _____

Does the report include program/intervention recommendations?

_____ Yes _____ No

Does the report include recommendations for further evaluations/research?

_____ Yes _____ No

****

Coder: _____KDM _____ GB _____ EM _____CSL Other: _____

Date: _____

Appendix B: School Readiness Tables

Table 1: Program Characteristics of Quasi-experimental and Experimental Evaluations

School Readiness Initiative	Funding Source	Age of Participants	Duration	Intensity	Class Size/Ratio	Teacher Qualifications
Michigan School Readiness Evaluation (2000)	Michigan State Department of Education	Entry: 4 years old Exit: 5 years old	Minimum of 30 weeks (300 hours; 120 days)	Minimum of four days at 2.5 hours per day	Class Size: 18 per session; 36 per teacher Ratio: 1:8 *(Seeds of Success)*	School district: MI elementary certificate with EC endorsement Agency: 4 years formal training in child development (may include CDA or AA in child development)
Early Head Start (2001)	ACYF/DHHS	Birth – 3 years old	Maximum of three years	Center-based (full day/full year; minimum of six hours per day) Home-based Mixed approach	Ratio: 1: 4	Lead teachers have to have at least a CDA, and assistants have to have a high school diploma or GED.
ECEAP (State of Washington)	Washington State Office of Community Development	Entry: 3 or 4 years old Exit: 5 years old	One to two years	Center-based (minimum of three days at 10 hours per week) Home-based (weekly, 90 visits plus peer group experience for children) Mixed approach	Class size: 18 (24 in school setting) Ratio: 1:6 *(Seeds of Success)*	Teachers must have BA in early childhood education or child development and a minimum of 2 years experience in a child care, pre-k, or kindergarten setting.
Currie & Thomas (1999)	National Science Foundation grant	Children age 5 in NLSY	Head Start participants one to two years	Center-based Home-based Mixed approach	4- and 5-year-olds, no more than 20 3-year-olds, no more than 17	Lead teachers have to have at least a CDA, and assistants have to have a high school diploma or GED.
Six-County Smart Start Evaluation	North Carolina Partnership for Children	Varies depending on program and agency	Varies depending on program and agency	Varies depending on program and agency	No state pre-K regulations on ratios or class size	No state pre-K regulations on teacher qualifications
Ohio–Head Start Report (1998)	Legislative Office of Equal Opportunity	Entry: 4 years old Exit: 5 years old	Typically one year	Head Start 130–135 days per year 3 _ hours per day Family services (N = 452) Title I preschool 145–150 days per year 2 _ hours Limited family services (N = 261) Unknown (N = 517)	4- and 5-year-olds, no more than 20 3-year-olds, no more than 17	Head Start CDA certificate with 1 year experience Title I preschool Teaching certificate in early childhood education or early childhood specialist; licensing valid OH [?] pre-K associate's certificate with four courses in child development.

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School Readiness Initiative	Funding Source	Age of Participants	Duration	Intensity	Class Size/Ratio	Teacher Qualifications
Washington, DC Public Schools (Marcon, 2000)	District of Columbia Public Schools	4 years old	September to June (corresponds to regular school year)	Full school day, five days per week	Class Size: Public School Preschool Program – 20 District-funded Head Start – 20 Ratio: Public preschool – variable Head Start – 1:10	Head Start lead teachers have to have at least a CDA, and assistants have to have a high school diploma or GED. Public school teachers must be certified.
Chicago Child-Parent Center (Reynolds, 2001)	Title I/ESEA	Entry: 3 years old Exit: 9 years old (Data on 20-year-olds)	Typically four to six years	Comprehensive health, education, and family services; preschool (half- or full-day); kindergarten (half- or full-day)		
Kentucky Preschool Program	Kentucky Department of Education	Entry: 3 or 4 years old Exit: 5 years old	One to two years	Classroom-based Minimum of four days per week, three hours per day	Maximum class size: 20 Ratio: 10:1	Preschool teacher with certification in Interdisciplinary Early Childhood Education, or preschool associate with a CDA or AA who is supervised by a preschool teacher.

NR = not regulated

Additional Sources:

Schulman, K., Blank, H., & Ewen, D. (1999). *Seeds of Success*. Washington, DC: Children's Defense Fund.

Table 3: Design Characteristics of Quasi-experimental and Experimental Evaluations

School Readiness Initiative	Research Design	Sample Size	Comparison Group	Type of Measure	Outcomes
Michigan School Readiness Evaluation (2000)	Quasi-experimental	Total N = 1,252 Cohort 1: Treatment Group = 351 Control Group = 272 Cohort 2: Treatment Group = 214 Control Group = 415	Program eligible non-attendees (matched on age and SES)	COR (Kg) SRRS (Kg., 1st and 2nd) School records	MSRP group scores significantly higher on 5/6 COR subscales than comparison group (kindergarten). Kindergarten teachers rated MSRP kids higher on retaining learning and ready to learn. Grade 1 teachers rated MSRP higher in attendance. Grade 2 teachers rated MSRP higher in interest in school and physical abilities.
Early Head Start (2001)	Experimental	Total N = 3,001 Treatment Group = 1,513 Control Group = 1,488	Program eligible non-attendees who were placed on a waiting list for Head Start	Bayley MDI Bayley BRS MacArthur CDI CBC – Aggression subscale Structured Play	A year or more after enrollment, EHS 2-year-olds outperformed control group on cognitive, language, and social-emotional indicators.
PCEAP (State of Washington)	Quasi-experimental	Total N = 1358	Program eligible non-attendees who were matched on some variables (age, gender, ethnicity)	Parent Int. Form Adolescent Self-Report Inv. Student Info Form Student Behavior Form School Archival Record Search	Parent Report Families not receiving public assistance (PA) rated child's health better. No PA kids enjoy school more. No PA kids show better academic progress. No PA kids are more sociable and have higher self-esteem. No difference indicated on school adjustment. Teacher Rating No PA kids show better academic progress.
Currie & Thomas (1999)	Quasi-experimental	Total N = 750	Siblings who attended either another preschool program or had no preschool experience	PPVT PIAT – Math PIAT – Reading Grade repetition	Controlling for maternal fixed effects Positive effect on PPVT, PIAT-Math, and retention. Mexican-origin benefit most from Head Start, Puerto Rican children the least.
Six-County Smart Start Evaluation	Quasi-experimental	Total N = 508 Treatment Group = 214 Control Group = 294	Comparison group of classmates who had attended non-Smart Start centers or family child care. Controlled for poverty and gender.	Kindergarten Teacher Checklist (KTC) PPVT-III SSRS	Children in *direct* subgroup had higher ratings on KTC. Only slight difference on PPVT-III, and no difference on the SSRS.
Ohio–Head Start Report (1998)	Quasi-experimental	Total N = 1,230 Head Start = 452 Title I pre-K = 261 Unknown = 517	Title I preschool students and students whose preschool experiences were unknown. Controlled for gender, race, and poverty levels.	Receptive language Expressive language Auditory memory Visual memory Visual discrimination Fine motor Gross motor Social competency Attendance rate	Literacy Readiness Title I higher on receptive language and auditory memory than Head Start or unknown. Title I higher than unknown on visual memory. Title I higher than Head Start on visual discrimination and fine motor. Title I higher than Head Start on social competency. No difference on attendance rates.
Educational transitions in early childhood, middle childhood, and early adolescence: Head Start vs. public school pre-kindergarten graduates (Marcon,	Quasi-experimental	Total N = 288	Head Start vs. public pre-K attendees. Controlled for economic differences.	Retention Special education placement CTBS scores DCPS	No significant difference in grade retention or special education placement. Pre-primary grades Number skills P>H All other subject areas, P=H Primary grades GPA - P>H

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School Readiness Initiative	Research Design	Sample Size	Comparison Group	Type of Measure	Outcomes
2000)					Reading P>H Language P>H All other subject areas P=H Upper Elementary P=H
Reynolds (2001)	Quasi-experimental	Total N = 1,539 Treatment Group = 989 Control Group = 550	Participated in other early childhood program such as full-day kindergarten and Head Start. Matched on age of entry, eligibility for and participation in government funded programs, neighborhood, and family poverty.	High school completion Juvenile arrests Violent arrests School dropout	Among those involved in program there was: Higher rate of high school completion Lower rate of dropout More years of education Lower rate of juvenile arrests Lower rate of multiple arrests Lower rate of grade retention Lower rate of special education
Kentucky Preschool Program	Quasi-experimental	<u>1996–1997 Evaluation</u> 226 preschool children 1,897 children from previous cohorts <u>1997–1998 Evaluation</u> 841 children	Program eligible non-attendees	Battelle Developmental Inventory Letter Identification and Concepts about Print Test (Clay, 1992) Social Skills Questionnaire	<u>1996–1997 Evaluation</u> Among 226 preschool children, those who attended KPP were rated higher on readiness than children who were eligible but did not attend. <u>1997–1998 Evaluation</u> Re-analyzed data from previous evaluations to look for differences according to race and gender. With regard to race, no difference with one exception. White children had fewer behavior problems than black children. In terms of gender, at-risk males made greater gains than at-risk females in large-muscle development and cognitive development. In the disabilities group, females made more progress than males in receptive communication. <u>1997–1998 Evaluation also looked at cumulative findings:</u> Children with greatest gains are most behind at beginning of school year. Children who attend KPP continue to do as well as peers in both social and academic skills at least through the fourth grade.

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Table 4: Instruments Used and Outcomes Assessed Among Quasi-Experimental and Experimental Designs

School Readiness Initiative	Instruments Used	Child Development					School Performance					Long-Term Outcomes	
		Overall Dev.	Language/ Literacy	Logic/ Math	Child Health/ Physical Dev.	Social Dev.	Achievement Tests	Retention	School Adjustment/ Attitude	Special Services	Attendance	Drop-out	Arrest Record
Michigan School Readiness Evaluation	COR (Kg)	◆	◆	◆		◆							
	School Readiness Rating Scale (Kg., 1st & 2nd)				◆	◆			◆		◆		
	School records										◆		
	Child Development Rating (CDR)					◆		◆	◆		◆		
Kentucky Preschool Program	Battelle Developmental Inventory	◆	◆		◆	◆							
	Letter Identification and Concepts about Print Test (Clay, 1992)		◆										
Early Head Start (2001)	Bayley MDI	◆											
	MacArthur CDI		◆										
	Structured play												
	Parent interview					◆							
					◆								
ECEAP (State of Washington)	Parent interview form		◆	◆	◆				◆	◆			
	Adolescent Self-Report Inventory				◆	◆							
	Student information form												
	Student behavior form									◆	◆		
	School archival record search					◆							
								◆		◆	◆		
Currie & Thomas	Peabody Picture Vocabulary Test		◆										
	Peabody Individual Achievement Test – Math			◆									

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School Readiness Initiative	Instruments Used	Child Development					School Performance					Long-Term Outcomes	
		Overall Dev.	Language/ Literacy	Logic/ Math	Child Health/ Physical Dev.	Social Dev.	Achievement Tests	Retention	School Adjustment/ Attitude	Special Services	Attendance	Drop-out	Arrest Record
	Peabody Individual Achievement Test – Reading		◆										
	Grade repetition							◆					
Six-County Smart Start Evaluation	Kindergarten Teacher Checklist (KTC)		◆		◆	◆							
	PPVT – III		◆										
	Social Skills Rating Scale					◆							
Ohio-Head Start Report (1998)	Literacy readiness		◆										
	Social competency					◆							
	Attendance rate										◆		
Educational transitions in early childhood, middle childhood, and early adolescence (Marcon, 2000)	Retention							◆					
	Special education placement									◆			
	CTBS scores						◆						
	Report cards						◆						
Reynolds (2001)	High school completion											◆	
	Juvenile arrests												◆
	Violent arrests												◆
	School drop-out											◆	
	Retention							◆					
	Special education									◆			

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Table 5: Program Characteristics of Pre-Experimental Evaluations

School Readiness Initiative	Funding Source	Age of Participants	Duration	Intensity	Class Size/ Ratio	Teacher Qualifications
Maryland State Board of Education—School Year 2001–2002	Maryland State Board of Education	Pre-k and kindergarten	Varies according to program	Varies according to program	Varies according to program	Varies according to program
Even Start Family Literacy Program — Second National Evaluation (1998)	U.S. Department of Education	Entry: 2 years old Exit: 5 years old (Average age = 4.2)	Average time in program = 10 months	Under age 5, average 12.5 times per month	Most Even Start services are provided in conjunction with other programs such as Head Start or center-based child care	Paid instructors 51% - BA 24% - MA Aides 4% - Did not complete high school 73% - Diploma or GED 12% - AA 10% - BA or higher
Kansas State Department of Education—Four Year-Old At-Risk Program: Final Evaluation (2002)	Kansas State Department of Education	Entry: 4 years old Exit: 5 years old	One year	Minimum of 2.5 hours per day or 465 hours per year	Local decision	Teachers must have certification in early childhood or elementary education.
Missouri's School Entry Assessment Project	Missouri Department of Elementary and Secondary Education	Average school age entry – 5.8	One to two years	Minimum of 3 hours per day, five days per week.	Class size: 20 Ratio: 1:10	Non-public school teachers must have a CDA or an AA degree. Public school teachers must have an AA or BA in early childhood.
Kindergartners' Skills in Smart Start Counties in 1995: A Baseline from Which to Measure Change. **Maxwell, Bryant, Keyes, & Bernier (1997)**	North Carolina Partnership for Children	Varies depending on program and agency	Varies depending on program and agency	Varies depending on program and agency	NR	NR
Georgia—Applied Research Center	Georgia Office of School Readiness	4 years olds	At least 180 days	6.5 hours/5 days per week	Class size: 20 Ratio: 1:10	Teachers must have CDA, teacher certification in early childhood, a BA, or a vocational early childhood education degree.
2000 Kindergarten Survey Report—Oregon Department of Education	Oregon Department of Education	Assessed in kindergarten year			Class size: 3-year-olds: 17 4-year-olds: 20 Ratio: 3-year-olds: 17:2 4-year-olds: 10:1	Teachers must have CDA or BA with specialization in early childhood.
2000– 2001 Head Start/ECAP Outcomes Report—State of Delaware	Early Childhood Assistance Program (ECAP) State of Delaware, Interagency Resource Management	Head Start (3 and 4 years olds) ECAP programs	One year	Minimum of 4 days per week, for 4 hours per day.	Class Size: DE allows up to 20 children per pre-K class, but recommends 17	Teachers must have CDA or BA with specialization in early childhood education

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School Readiness Initiative	Funding Source	Age of Participants	Duration	Intensity	Class Size/ Ratio	Teacher Qualifications
	Committee				Ratio: 10 to 1	
Saginaw, Michigan		Entry : 4 years old Exit: 5 years old	Minimum of 30 weeks (300 hours; 120 days)	Minimum of 4 days per week, 2.5 hours per day	Class Size: 18 per session; 36 per teacher Ratio: 1:8 *(Seeds of Success)*	School district Michigan elementary certificate with EC endorsement Agency 4 years of formal training in child development (may include CDA or AA in child development)
Head Start/FACES	ACYF/DHHS	Entry: 3 or 4 years old Exit: 5 years old	One to two years	Center-based (4 or 5 days per week for a minimum of 3.5 hours to a maximum of 6 hours per day) 4-day program: 128 days per year 5-day program: 160 days per year Home-based Mixed approach	Class size: 4- and 5-year-olds, no more than 20 3-year-olds, no more than 17	Lead teachers have to have at least a CDA and assistants have to have a high school diploma or GED.
Illinois Pre-kindergarten Program (2000)	Early Childhood Block Grant	Entry: 3 or 4 Exit: 5	1 – 2 years	Programs typically serve children four days each week. Staff development or parent involvement activities are held on the fifth day	Class size: 20 Ratio: 10:1	Teachers must have a teaching certificate in early childhood education

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NR = not regulated

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Table 6: Design Characteristics of Pre-Experimental Evaluations

School Readiness Initiative	Research Design	Sample Size	Type of Measure	Outcomes
Maryland State Board of Education—School Year 2001-2002	Pre-experimental	1,900 kindergarten teachers rated each student in their classrooms	Demographic information Work Sampling System	Composite Scores for Students in Prior Care: Child care center – 45%, full readiness Family child care – 45%, full readiness Head Start – 43%, full readiness Home/Informal care – 39%, full readiness Non-public nursery – 67%, full readiness* Pre-kindergarten – 47%, full readiness (* = significant)
Even Start Family Literacy Program—Second National Evaluation (1998)	Pre-experimental	Sample study included Even Start participants in 57 sites.	Preschool Inventory (PSI) Preschool Language Scales (PLS – 3)	Used a statistical growth model to predict children's growth on PSI and PLS-3. Concluded that children who remain in Even Start for longer periods of time will grow at a faster rate than those who do not remain in Even Start.
Kansas State Department of Education—Four-Year-Old At-Risk Program: Final Evaluation (2002)	Pre-experimental	One-third of 2,097 students served during the 2000–2001 preschool year were selected and observed fall and spring	Work Sampling Developmental Checklist	Most growth occurred in Mathematical Thinking. Least growth occurred in Physical Development. Children with only 1–2 risk factors began and ended the year with higher ratings than children with more than two. This was particularly true for ESL children and children with developmental delays.
Missouri's School Entry Assessment Project (draft, 2002)	Pre-experimental (cross-sectional survey)	Sample of approximately 3,100 kindergarteners from 68 schools	School Entry Profile (65 items across seven domains: symbolic development, communication, mathematical/physical knowledge, working with others, learning to learn, conventional knowledge, physical development)	Overall, 30% were rated as above average, 22% below average, and about 50% were rated as average. Pre-Kindergarten Experience: Children who were home-based during preschool years perform lowest, particularly true for children in poverty. Children who participated in PAT plus preschool score higher in almost every domain.
Kindergartners' Skills in Smart Start Counties in 1995: A Baseline from Which to Measure Change. **Maxwell, Bryant, Keyes, & Bernier (1997)**	Pre-experimental survey	Sample from 43 Smart Start counties. Included 858 kindergarten teachers rating 3,782 students	Kindergarten Teacher Checklist General School Readiness Survey	18% of kindergarteners were "not ready" for school. Children who attended organized child care prior to school scored significantly better than children who did not attend child care.
Georgia – Applied Research Center	Pre-experimental – 4th year of longitudinal study of pre-K participants	Original sample of 3,639 students from 203 pre-K classrooms Children currently entering third grade (ratings on 2,407)	Twenty-four skill areas gleaned from Georgia Quality Core Curriculum (QCC) Retention Readiness for third grade	Greatest gains in math, science, and language arts. Significant gains were also noted in attitude toward learning and asserting independence. Respect for authority declined. 90% progressed to second grade and were on grade level. 57% were judged good to extraordinarily good in terms of readiness for third grade. Add average readiness, and the number jumps to 82%.
2000 Kindergarten Survey Report—Oregon Department of Education	Pre-experimental – survey of kindergarten teachers (70% response rate)	985 kindergarten teachers from 1,411 schools (1,172 public, 239 private) rated a total of 18,427 students Teachers surveyed in November, 2000	Oregon Kindergarten Readiness Survey (physical well being, language usage, approach to learning, cognition/general knowledge, social/emotional development, and motor development)	65% of public school children met all readiness dimensions, and 80% of private school children met all dimensions. Percent meeting 5 or more readiness dimensions: 88.6% of children who attended preschool 69.7 % of children who attended Head Start 52.6% who attended Early Childhood Special Education (ECSE)

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School Readiness Initiative	Research Design	Sample Size	Type of Measure	Outcomes
2000–2001 Head Start/ECAP Outcomes Report—State of Delaware	Pre-experimental Children assessed in September 2000 and May 2001 while they were in program.	495 randomly selected children from 13 programs	Sites selected from list of approved instruments: Carolina Developmental Profile Child Development & Learning Checklist Class Progress Chart Creative Curriculum LAP-D Work Sampling System	Using the assessment instrument chosen by the site, standard scores were established in four domains: cognitive, communication, physical, and social/emotional development. Results show significant gains in all domains: Cognitive skills – 27.7% Communication – 33.87% Physical skills – 20.37% Social/emotional – 26.09%
Saginaw, Michigan	Pre-experimental Post-test only at end of preschool year.	309 children from 13 sites	Pre-kindergarten Saginaw Objective Reference Test (31 items focusing on cognitive and psychomotor objectives)	Pre-k students attained 9/9 cognitive objectives. Expressive language – semantics showed lowest attainment (83.8%) Expressive language – labeling showed greatest level of attainment (98.7%)
Head Start/FACES	Pre-experimental	Sample stratified by three variables: Region of the country Urbanicity Percentage of minority families 3,200 children in original sample	PPVT – III Story/Print Concepts Woodcock-Johnson (3) Social Awareness Tasks Teacher Report Parent Report McCarthy Draw-a-design COR Color Names/Count Phonemic Analysis Task ECLS-K General Knowledge Direct Observation	Significant gains in vocabulary and writing Little progress on letter recognition, math, and book knowledge Improvement in social skills, but little change in problem behavior Greatest gains among lowest children
Illinois Pre-kindergarten Program (2000)	Pre-experimental Teacher Survey Cohort Longitudinal Study		Pre-kindergarten Student Record Illinois Standards Achievement Test (ISAT) Teacher rating	Teacher Survey FY 2000, 80% of children were ranked average/above average in kindergarten readiness. Cohort Study (1994–1995 pre-k) Kindergarten: Reading – 79.5% (average or above) Math – 81.6% Language – 81.1% Behavior – 82%

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